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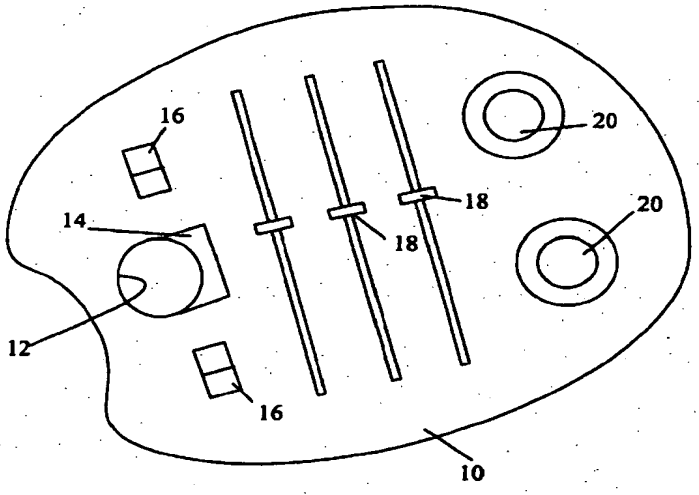
(54) Control of an agricultural vehicle

(57) An agricultural vehicle is disclosed having a remote control panel 10 movable relative to the vehicle for enabling at least one of the functions of the vehicle to be controlled by an operator situated at a location remote from the vehicle. A docking station is provided in the vehicle cab to receive the remote control panel 10 to allow the same control panel to be used by the operator form within the cab as well as from a remote location. The remote control panel 10 is ergonomically shaped to resemble an artist's pallet having a thumb hole to allow the panel to be held securely in one hand while the controls on the panel are operated with the other hand.



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Description

[0001] The present invention relates to the control of the functions of an agricultural vehicle, such as a tractor, and/or any implements carried or pulled by the vehicle.

[0002] Currently, all the controls of a tractor are mounted in the operator's cab. However, from the cab, the operator cannot see sufficiently well to control certain functions, such as the setting of the position of the hydraulic power lift, and to overcome this problem it is sometimes necessary for another person to stand outside the vehicle to give the operator appropriate instructions.

[0003] It is known to place a electrical switches or mechanical levers on or adjacent to the rear tractor fender but these solutions only place the operator in a fixed and mostly dangerous position close to the hydraulic power lift, the power take-off shaft and the driven implement.

[0004] It is therefore an object of the present invention to mitigate the foregoing problems and to allow a single operator to control certain functions of an agricultural vehicle with improved efficiency and safety.

[0005] In accordance with the present invention, there is provided an agricultural vehicle having a remote control panel movable relative to the vehicle for enabling at least one of the functions of the vehicle and/or an associated implement to be controlled by an operator situated at a location remote from the vehicle.

[0006] Preferably, a docking station is provided in the vehicle cab to receive the remote control panel to allow the same control panel to be used by the operator from within the cab as well as from a remote location.

[0007] Advantageously, the remote control panel is ergonomically shaped to resemble an artist's pallet having a thumb hole to allow the panel to be held securely in one hand while the controls on the panel are operated with the other hand.

[0008] In order to prevent accidental operation of the control of the vehicle, a dead man's switch may be provided on the remote control panel that is operated only when the control panel is securely held with the operator's thumb in the thumb hole. Such a switch may be used to switch off the engine of the agricultural vehicle, it being possible to re-start the engine only after the remote control panel has been reset following completion of the necessary adjustment of the controlled functions.

[0009] In the case of a tractor, the remote control panel may conveniently include controls for a hydraulic power lift for setting the position of an implement driven by the tractor.

[0010] To safeguard the operator from danger, it is preferred to provide means on the vehicle for determining the position of the operator in relation to the vehicle and means for disabling the remote control panel, or switching off the vehicle engine, if the operator moves too close to the vehicle.

[0011] Such sensing of the position of the operator may be performed by known passive techniques, such as by using a passive infra red detector, a capacitative sensor or an acoustic sensor.

[0012] Alternatively, the remote control panel may include a transponder co-operating with transmitters on board the vehicle, to allow the position of the operator to be determined by triangulation using known radar techniques.

[0013] The remote control panel may communicate with the vehicle using a wired cable or a wireless communication link. In the latter case, the communication link may for example be an infra red or a radio link.

[0014] The invention will now be described further, by way of example, with reference to the accompanying drawing in which the single figure shows a remote control panel of the invention.

[0015] In the drawing, there is shown a remote control panel 10 that is ergonomically designed to be held firmly in one hand and resemble an artist's pallet. In this respect, the periphery of the panel defines a curved hand recess and a thumb hole 12 is formed near this recess. A dead man's switch 14 defines part of the periphery of the thumb hole 14 and is closed automatically when the panel is held firmly in an operator's hand. Controls for various functions of an agricultural vehicle are mounted on the remote control panel 10, which controls may take any known form such as rocker switches 16, variable slider controls 18 and rotary control knobs 20. In addition, a display screen (not shown) equally may be provided.

[0016] The remote control panel 10 communicates with the agricultural vehicle using a preferably wireless communication link to communicate the positions of the various controls on the remote control panel to control circuitry on the vehicle.

[0017] The remote control panel can be used from outside the vehicle to perform any desired task normally carried out from within the operator's cab, such as positioning of the hydraulic power lift, operating the power take-off shaft, setting the engine speed, controlling functions of an implement, etc. While such a control may be used in addition to a similar such control within the cab, it is preferred to provide a docking station in the cab so that the same controls on the control panel can be used by the operator from within the cab. This avoids unnecessary duplication. If desired, the docking station may include an electrical socket establishing a direct connection between the vehicle circuitry and the controls of the remote control panel, allowing the controls to function even if the wireless communication link should fail. A suitable position for the docking station in a conventional cab would be adjacent the powershift lever.

[0018] The purpose of the dead man's switch 14 is to ensure that none of the controls can be operated accidentally when the remote control panel is removed from the docking station. As soon as the switch 14

returns to an open position because of the release of the remote control panel, either the engine is stopped without having the possibility to restart it until the remote control panel has been reset, or the remote control panel is made inoperative e.g. by disconnecting the power source inside the pallet 10.

[0019] To avoid danger to the operator, it is desirable to sense the position of the operator, or the remote control panel and to switch off the engine or disable the remote control panel if the operator is too close to the vehicle. The preferred method of sensing the position of the operator carrying the remote control panel is to set up an e.m.f. field surrounding the agricultural vehicle and sense any disturbance in the field as a result of the proximity of the operator. Such detection of the proximity of the operator can be used to switch off the engine or immobilise the remote control panel to avoid injury to the operator. The same field also could sense the approach of livestock, and react accordingly.

[0020] A further manually or automatically operated switch (not shown) on the panel 10 could indicate whether the operator is left or right handed and change the orientation of the display screen and eventually reverse the operation of certain switches and slider controls on the panel 10 to accommodate the difference.

[0021] The described remote control panel offers, inter alia, the following advantages over prior controls.

- The panel can replace most of the current vehicle controls on the console of the cab, thereby increasing the space within the cab significantly and reducing the number of components. This results in cost savings as well increasing the functionality and value of the vehicle.
- The flexibility of the ergonomic design of the control panel of the preferred embodiment of the invention provides an improved operator interface which can be fitted to the B pillar of the vehicle, to the operator's seat or hand held.
- The remote control panel allows functions that normally require the presence of a second person to guide the operator, but now can be performed single handed with resultant improvement in efficiency, speed and safety. Indeed the remote control panel may permit tasks to be performed that are currently impossible.
- Lastly, the flexibility of the design facilitates operation by left-handed operators and operators with restricted mobility.

Claims

1. An agricultural vehicle characterized in that a remote control panel (10) is provided which is movable relative to the vehicle for enabling at least one of the functions of the vehicle and/or an associated implement to be controlled by an operator situated at a location remote from the vehicle.

2. An agricultural vehicle according to claim 1, characterized in that a docking station is provided in the vehicle cab to receive the remote control panel (10), so as to allow the same control panel (10) to be used by an operator both from within the cab and from a remote location.

3. An agricultural vehicle according to claim 2, characterized in that the functions of the movable control panel (10) are not duplicated on a fixed control panel in the vehicle cab.

4. An agricultural vehicle according to claims 1 to 3, characterized in that the remote control panel (10) is shaped to resemble an artist's pallet, with a thumb hole (12) to allow the panel to be held securely in one hand while the controls (16, 18, 20) on the panel (10) are operated with the other hand.

5. An agricultural vehicle according to claim 4, characterized in that a dead man's switch (14) is provided on the remote control panel (10) that is operated only when the control panel (10) is securely held with the operator's thumb in the thumb hole (12).

6. An agricultural vehicle according to claim 5, characterized in that the dead man's switch (14) is operative either to switch off the engine of the agricultural vehicle when not closed by an operator's hand or to disable the function of the panel (10).

7. An agricultural vehicle according to claim 4 and any claims appended thereto, characterized in that the panel (10) comprises means to determine whether the operator is left or right handed.

8. An agricultural vehicle according to claim 7, characterized in that the panel (10) comprises a display screen, the orientation of which is changed depending on the operator being left or right handed.

9. An agricultural vehicle according to any of the preceding claims, characterized in that the remote control panel (10) includes a control for a hydraulic power lift serving to set the position of an implement driven by the vehicle.

10. An agricultural vehicle according to any of the preceding claims, characterized in that it further comprises means on the vehicle for determining the position of the operator and/or livestock in relation to the vehicle and means for disabling the remote control panel, or switching off the vehicle engine, if the operator moves too close to the vehicle.

11. An agricultural vehicle according to claim 10, characterized in that the means for determining the

position of the operator include a passive infra red detector, a capacitative sensor or an acoustic sensor.

12. An agricultural vehicle according to claim 10, characterized in that the means for determining the position of the operator include a transponder cooperating with transmitters on board the vehicle, to allow the position of the operator to be determined by triangulation.

13. An agricultural vehicle according to any of the preceding claims, characterized in that the remote control panel (10) communicates with the vehicle using a radio or infra red communication link.